

Attorney Docket No.: 02SPE118P-DIV

In the Claims:**Claims 1-117 (canceled).**

Claim 118 (previously presented): A method of manufacturing an interconnect, said method comprising steps of:

forming a first patterned layer of conductive material, said first patterned layer having a trench situated between a first and a second interconnect line;

depositing a first insulating layer over said first patterned layer, said first insulating layer filling said trench;

depositing a first hard mask on said first insulating layer;

forming a first air gap, a second air gap, and a support pillar in said first hard mask and said first insulating layer, said support pillar being situated between said first air gap and said second air gap, said support pillar, said first air gap, and said second air gap being situated in said trench in a direction parallel to a length of said first interconnect line, said support pillar being in contact with said first interconnect line;

depositing a sealing layer over said first hard mask to seal said first air gap and said second air gap;

depositing a second insulating layer over said sealing layer;

depositing a second hard mask over said second insulating layer;

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forming a via hole through said second hard mask, said second insulating layer, said sealing layer, said first hard mask, and said first insulating layer; wherein said support pillar is formed to increase mechanical strength and thermal conductivity of said first interconnect line, wherein said first insulating layer and said sealing layer comprise a low dielectric constant material.

Claim 119 (previously presented): The method of claim 118 further comprising steps of:

forming a conductive plug in said via hole;
forming a second patterned layer of conductive material over said second hard mask.

Claim 120 (new): A method of manufacturing an interconnect, said method comprising steps of:

forming a first patterned layer of conductive material, said first patterned layer having a trench situated between a first and a second interconnect line;
depositing a first insulating layer over said first patterned layer, said first insulating layer filling said trench;
depositing a second insulating layer over said first insulating layer;
depositing a first hard mask on said second insulating layer;

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forming a first air gap, a second air gap, and a support pillar in said first hard mask, said second insulating layer, and said first insulating layer, said support pillar being situated between said first air gap and said second air gap, said support pillar, said first air gap, and said second air gap being situated in said trench in a direction parallel to a length of said first interconnect line, said support pillar being in contact with said first interconnect line;

depositing a sealing layer over said first hard mask to seal said first air gap and said second air gap;

depositing a third insulating layer over said sealing layer;

forming a via hole through said third insulating layer, said sealing layer, said first hard mask, said second insulating layer, and said first insulating layer;

wherein said support pillar is formed to increase mechanical strength and thermal conductivity of said first interconnect line, wherein said first insulating layer and said sealing layer comprise a same low dielectric constant material.

Claim 121 (new): The method of claim 120 further comprising steps of:

forming a conductive plug in said via hole;

forming a second patterned layer of conductive material over said sealing layer.

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Claim 122 (new): A method of manufacturing an interconnect, said method comprising steps of:

forming a first patterned layer of conductive material, said first patterned layer having a trench situated between a first and a second interconnect line;

depositing a first insulating layer over said first patterned layer, said first insulating layer filling said trench;

depositing a second insulating layer over said first insulating layer;

depositing a first hard mask on said second insulating layer;

forming a first air gap, a second air gap, and a support pillar in said first hard mask, said second insulating layer, and said first insulating layer, said support pillar being situated between said first air gap and said second air gap, said support pillar, said first air gap, and said second air gap being situated in said trench in a direction parallel to a length of said first interconnect line, said support pillar being in contact with said first interconnect line;

depositing a sealing layer over said first hard mask to seal said first air gap and said second air gap;

depositing a third insulating layer over said sealing layer;

depositing a second hard mask over said third insulating layer;

forming a via hole through said second hard mask, said third insulating layer, said sealing layer, said first hard mask, said second insulating layer, and said first insulating layer;

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wherein said support pillar is formed to increase mechanical strength and thermal conductivity of said first interconnect line, wherein said first insulating layer and said sealing layer comprise a same low dielectric constant material.

Claim 123 (new): The method of claim 122 further comprising steps of:
forming a conductive plug in said via hole;
forming a second patterned layer of conductive material over said second hard mask.